TETRA TECH

Adam Peterca
Project Manager

August 22, 2016

Mr. Mike Beslow
On-Scene Coordinator
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

Subject: **Final Letter Report – Brookfield IL Residential Mercury Spill**
EPA Contract No. EP-S5-13-01
Technical Direction Document No. S05-0001-1606-008
Document Tracking No. 1032

Dear Mr. Beslow:

Tetra Tech Inc. (Tetra Tech) is submitting the final Letter Report for the Brookfield IL Residential Mercury Spill. This Letter Report summarizes removal action activities conducted on June 29 and July 13, 2016, and addresses your comments on the draft report that Tetra Tech submitted on August 8, 2016. If you have any questions regarding this report, please call me at (312) 201-7768.

Sincerely,

[redacted]

Project Manager

Enclosure

cc: [redacted] Tetra Tech Program Manager
TDD File

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FINAL LETTER REPORT
BROOKFIELD IL RESIDENTIAL MERCURY SPILL
BROOKFIELD, COOK COUNTY, ILLINOIS

Prepared for

U.S. Environmental Protection Agency
Emergency Response Branch
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Submitted by

Tetra Tech Inc.
1 South Wacker Drive, 37th Floor
Chicago, IL 60606

EPA Contract No. EP-S5-13-01

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August 22, 2016

Prepared by

[redacted]

Project Manager

Approved by

[redacted]

START QC Reviewer

CONTENTS

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) tasked Tetra Tech Inc. (Tetra Tech), under Superfund Technical Assessment and Response Team (START) Contract EP-S5-13-01, Technical Direction Document (TDD) No. S05-0001-1606-008, to perform emergency response activities associated with a mercury release at a single-family residence located at [redacted], Brookfield, Cook County, Illinois.

USEPA and START performed an initial assessment of the concentration of mercury vapors in the residence and attempted limited remediation of spilled mercury during initial response efforts. The homeowners hired a private contractor to seal the wood floors with polyurethane where mercury was spilled, following the recommendations of the Agency for Toxic Substances and Disease Registry (ATSDR). USEPA and START performed a final clearance screening of mercury vapor levels in the residence following the completion of polyurethane treatment.

Section 2.0 of this report discusses the background for USEPA's involvement in this site. Section 3.0 describes methods used to conduct the mercury screening, and Section 4.0 describes personal protective equipment (PPE) used and action levels. Section 5.0 provides a narrative of response actions conducted to address this mercury spill, including the results of mercury screening and an analysis of the implications of these results. Section 6.0 provides a brief summary of the activities related to this mercury spill. Section 7.0 provides references used in this report.

Site figures showing the location and layout of the property are provided in Appendix A. Tables with compiled mercury screening results are provided in Appendix B. Appendix C contains START field notes and field data sheets used to record mercury vapor concentrations. Appendix D contains supplemental documentation. Appendix E provides information on the environmental impacts of this project.

2.0 BACKGROUND

The Illinois Department of Public Health (IDPH) requested USEPA assistance on June 28, 2016, in response to a mercury release at a single-family residence located at [redacted], Brookfield, Cook County, Illinois (See Figure 1 in Appendix A). According to the residents, the elemental mercury was released from the cracked wooden housing of an antique mirror. Some antique mirrors are known to have utilized mercury to create the reflective metal coating on the interior of the mirror (Centers for Disease Control and Prevention 2007). The residents discovered the release on June 25, 2016, when they removed the mirror from the dining room table to attempt to hang it. The mirror was sitting on the dining room table without being moved for an extended period prior to the discovery of elemental mercury beads, so the exact date of the rupture is unknown.

After discovering the release, the homeowners bagged the mirror and a tray that they observed mercury beads on and placed them in their garage, and removed their two small children from the house. The homeowners initially attempted to vacuum the visible mercury. They then performed online research and discovered vacuuming was an inappropriate cleanup method, and stopped vacuuming and bagged the vacuum for disposal. According to the homeowners, approximately ½ teaspoon of elemental mercury was recovered during these initial cleanup attempts. The residents contacted various local governmental agencies in an effort to determine their best course of action for remediation, eventually resulting in the request for USEPA to screen the residence for mercury vapors. In the intervening time between the discovery of the release and USEPA notification, the homeowners also contacted Servpro Industries, Inc. (Servpro), a restoration contracting firm. Servpro mobilized to the residence and collected the mirror, tray, and vacuum for disposal, and set up an air blower/scrubber to ventilate the house. The blower operated for approximately 36 hours. The homeowners also attempted to perform limited remediation by using tape to collect visible beads of mercury from the wood floor beneath the dining room table. Following their attempted remediation, the homeowners covered the floor in the vicinity of the release with a plastic dropcloth with the edges taped to the floor. The homeowners and their children occupied the residence for varying periods of time between the initial discovery of the release and the activation of USEPA.

USEPA responded to the IDPH request for assistance and mobilized to the residence around 9:00 a.m. on June 29, 2016. Respondents included USEPA On-Scene Coordinator (OSC) Mike Beslow and START contractor Adam Peterca. USEPA held a brief meeting with the homeowners to gain an understanding of the release and response actions that had already been taken. The homeowner then signed an access

agreement, granting USEPA permission to enter the residence and conduct mercury screening (Appendix D).

3.0 MERCURY INVESTIGATION METHODS

START performed the initial Brookfield mercury investigation on June 29, 2016, using a USEPA-owned Lumex RA-915+. The Lumex RA-915+ is capable of detecting mercury in ambient air at concentrations ranging from 2 nanograms per cubic meter (ng/m^3) to 200,000 ng/m^3, depending on the operation mode (Ohio Lumex 2001). The USEPA Lumex RA-915+ factory calibration was up to date, with the next factory calibration due on July 9, 2016. An in-field calibration check was completed per the manufacturer's specification at the start of each sampling day and recorded in the field logbook (see Appendix C).

START performed the final clearance screening on July 13, 2016, using a non-USEPA owned Lumex RA-915+. This Lumex RA-915+ factory calibration was up to date, with the next factory calibration due on April 7, 2017.

START screened mercury vapors in the ambient air and at floor level in each room of the affected property, and also on surfaces requested by the homeowners. A breathing zone measurement was collected immediately after personnel entered the building. Breathing zone concentrations were recorded in the field logbook or field data sheets (see Appendix C) as 10-second averages. These averages were calculated and displayed by the Lumex internal computer. Mercury floor and surface screening involved placing the hose (sampling intake) over the floor/surface in question, and moving the hose in a serpentine pattern throughout the floor/surface, with special focus on areas likely to trap mercury (such as cracks in floors, baseboards, and sinks). The mercury vapor concentration recorded was established when the instrument reading ceased increasing and started to decrease. Screening areas were biased toward locations identified by the occupants to be the source of mercury exposure, or locations where mercury may have been incidentally transported by the occupants.

4.0 ACTION LEVELS AND PPE

Action levels were based on the Joint USEPA and ATSDR Chemical-Specific Health Consultation for Action Levels for Elemental Mercury Spills (ATSDR 2012) and a site specific consultation with ATSDR. Specific action levels include isolation or evacuation of residence if mercury concentrations in the breathing zone are above 10,000 ng/m^3 and unrestricted residential use for mercury concentrations below 1,000 ng/m^3.

A breathing zone measurement above 12,500 ng/m^3 was the site-specific action level for personnel to upgrade from personal protective equipment (PPE) Level D to PPE Level C. This level was developed by Tetra Tech START using half the threshold limit value (TLV) for mercury, which is 25,000 ng/m^3 (American Conference of Governmental Industrial Hygienists 2001). Site activities were conducted in modified Level D, which included Tyvek booties and nitrile gloves.

5.0 MERCURY INVESTIGATION NARRATIVE

All investigation activities took place at the single-family residence where the spill occurred, located at [redacted], Brookfield, Illinois. The single-family residence was built in 1947 and consists of approximately 992 square feet, with an unfinished basement and a detached 2.5 car garage (Cook County Assessor's Office) (see Figure 2 in Appendix A). According to the homeowners, elemental mercury was observed only in the dining room of the house.

5.1 INITIAL SCREENING AND ATTEMPTED REMEDIATION

The initial mercury screening was conducted on June 29, 2016, using screening methods described in Section 3.0. Prior to making initial entry to the residence, START screened the occupants of the home with the Lumex RA-915+ to check for mercury contamination on clothes and shoes. All occupants (male and female homeowners, two children) were cleared of having significant amounts of mercury on clothes and shoes, with a maximum reading of 10 ng/m^3.

START performed a detailed survey of mercury vapor content within the house, with initial entry breathing zone readings of 74 ng/m^3, well below both the USEPA and ATSDR action level of 1,000 ng/m^3, and the action level for upgrading to Level C PPE of 15,000 ng/m^3. START performed a survey of breathing level, floor, and targeted mercury readings in each room in the residence (full results can be found in Table B-1 in Appendix B). This initial survey was conducted while the plastic dropcloth installed by the homeowners remained covering the floor of the dining room in the vicinity of the mercury release. During the initial survey with the dropcloth in place, the maximum breathing zone reading observed was 136 ng/m^3 in the kitchen, and the maximum surface reading observed was approximately 400 ng/m^3 at a location in the master bedroom where the homeowners' cat was frequently active. Based on this reading and the homeowners' indication that the cat often slept on the mirror that released elemental mercury, START screened the cat, with a maximum reading of 654 ng/m^3. ATSDR recommended that the homeowners bathe the cat with a dandruff shampoo that has relatively high sulfur content. The sulfur in the shampoo can bind to elemental mercury in the cat's fur, allowing it to be washed out.

After completing an initial survey with the plastic dropcloth in place with no observed readings above the USEPA and ATSDR action level, START screened the perimeter of the dropcloth and beneath the dropcloth. The maximum reading around the perimeter of the dropcloth, which was sealed with painter's tape, was 296 ng/m^3. START then surveyed beneath the plastic dropcloth by dividing the area into 4 sectors (northeast, northwest, southeast, and southwest), and poking a hole in the dropcloth near the

center of each sector, as well as in the location where the most beads of elemental mercury were observed by the homeowners. The hose of the Lumex RA-915+ was inserted into the hole, and a maximum surface reading was recorded immediately after poking each hole,. Following this measurement, the holes in the dropcloth were sealed with painter's tape. START observed a maximum reading of 11,700 ng/m^3 from beneath the dropcloth, observed in the area that the homeowners indicated they saw visible beads of mercury following the spill. The readings from beneath the dropcloth ranged from 1,011 to 11,700 ng/m^3, all of which exceeded the USEPA and ATSDR action level. After surveying beneath the dropcloth, START and USEPA exited the residence.

After exiting the primary residence, START screened a plastic bag containing clothes worn by the homeowners during their initial cleanup attempts. The bag was closed and allowed to sit in a warm location for approximately one hour prior to screening. The maximum reading from the bag of clothes was 4,281 ng/m^3. The homeowners indicated they would likely discard the clothes but would do so on their own. START also screened the detached garage, as the bagged mirror, tray, and vacuum were stored in the garage prior to disposal by ServPro. The maximum breathing zone reading in the garage was 11 ng/m^3, with a maximum surface reading from the counter that the materials were stored on of 14 ng/m^3. All readings from the garage were below the USEPA and ATSDR action level of 1,000 ng/m^3.

USEPA also screened the homeowners' personal vehicle, as the homeowners suspected that they may have occupied the vehicle while wearing clothing that could have been exposed to mercury. The vehicle was allowed to sit in the sun with all windows closed for approximately 15 minutes prior to screening. USEPA did not detect mercury vapor concentrations in exceedance of the ATSDR action level of 1,000 ng/m^3.

USEPA and the homeowners discussed possible options for remediation following the completion of initial mercury screening. Based on elevated readings from below the plastic dropcloth, with all readings elsewhere in the residence below the relevant action level while the dropcloth was in place, it appeared that significant mercury contamination was isolated to the dining room floor. USEPA and the homeowners agreed to have START attempt to perform limited remediation of the dining room floor using a portable mercury spill kit maintained on the START emergency response vehicle. The mercury spill kit was manufactured by New Pig Corporation, and consists of:

- A mercury absorbent powder, made of granular zinc and citric acid. When introduced to elemental mercury, a zinc amalgam is formed, binding the mercury to the powder and limiting volatilization

- Moist mercury cleanup wipes, used to collect fine particulates from the absorbent powder and decontaminate tools used during cleanup
- Disposable hand broom and dustpan for collecting absorbent powder
- Disposal bag and bucket for containerizing waste generated during application

To conduct an initial attempt at remediation, START removed the plastic dropcloth that was covering the floor of the dining room, spread mercury absorbent powder over the area that had been covered by the dropcloth, and allowed the powder to sit for approximately 10 minutes. START then used the disposable handbroom and dustpan to collect the bulk of the powder. Remaining fine particulates were wiped up using the moist mercury cleanup wipes. After completing the initial remediation attempt, the windows of the house were sealed and START waited approximately 15 minutes prior to screening of the dining room using the Lumex RA-915+. During this screening, START recorded maximum breathing zone readings of 1,200 ng/m^3, and maximum floor readings of 1,800 ng/m^3, both of which exceeded the action level of 1,000 ng/m^3 (see Table B-2 in Appendix B for a full record of mercury vapor concentration readings during remediation attempts using the mercury spill kit).

Based on the observed decrease in mercury vapor concentrations at the floor of the dining room (from 11,700 ng/m^3 pre-remediation to 1,800 ng/m^3 post-remediation), USEPA directed START to attempt a second application of mercury absorbent powder to the dining room floor. START followed the same methodology for this application as the first, including sealing windows and allowing approximately 15 minutes to pass before screening the room post-application. Following this second attempt at remediation, START recorded breathing zone mercury vapor concentrations ranging from 600 to 850 ng/m^3, below the action level. START also identified two hot spots on the floor of the dining room, with readings of 1,600 ng/m^3 and greater than 3,000 ng/m^3.

Based on a continued decrease of breathing zone mercury vapor concentrations and the identification of hot spots on the floor of the dining room, USEPA directed START to perform a third application of mercury absorbent powder with a focus on targeting hot spots. This application was performed in a similar manner to the first two applications, with the only deviation from the methodology described above consisting of applying the mercury absorbent powder only in the vicinity of the hot spots. Following the third attempt at remediation, START recorded maximum breathing zone mercury vapor concentrations of 330 ng/m^3, and maximum floor readings of 800 ng/m^3. Both of these readings were below the USEPA and ATSDR action level of 1,000 ng/m^3.

Based on the presence of two small children in the house, USEPA determined that additional investigation and remediation may be required. USEPA directed START to install a fresh plastic

dropcloth over the dining room floor, with the edges completely sealed with tape. This dropcloth was installed to assess whether source material still remained in the dining room floor that would require further remediation. START performed another screening following the installation of the dropcloth. The maximum breathing zone mercury vapor concentration with the dropcloth in place was 4 ng/m^3. The maximum mercury vapor concentration from beneath the dropcloth was 2,268 ng/m^3, with an average value of 1,200 ng/m^3. Based on these elevated readings from beneath the dropcloth and the presence of sensitive individuals in the home, USEPA, in consultation with ATSDR, recommended that the homeowners use polyurethane to seal any remaining source material in the floor, eliminating it as a source of mercury vapor in the house. USEPA discussed their options of using USEPA Emergency and Rapid Response Services (ERRS) contractors to install the polyurethane versus the homeowners taking individual action. The homeowners indicated that they would like to discuss the installation of polyurethane with their insurance company. USEPA and START demobilized from the site with the understanding that the homeowners would assess their options for the installation of polyurethane, and would leave the sealed plastic dropcloth in place over the source area to prevent mercury vapors from spreading through the house until the polyurethane treatment could be completed.

5.2 FINAL CLEARANCE SCREENING

On July 11, 2016, USEPA notified START that the homeowners had completed the installation of polyurethane on the wooden floors throughout the residence, and requested a final screening of mercury vapor concentrations to confirm the efficacy of this remedial solution. START (Peterca) and USEPA (OSC Beslow) mobilized to the site on July 13, 2016, to conduct the final clearance screening. START used a Lumex RA-915+ to measure mercury vapor concentrations in each room on the main floor of the residence, as well as at targeted floors and surfaces as directed by USEPA and requested by the homeowners (see Table B-3 in Appendix B for full results of final clearance screening). The maximum breathing zone mercury vapor concentration was 100 ng/m^3, observed in the dining room. The maximum mercury vapor concentration from a floor was 206 ng/m^3, observed in the southwestern corner of the dining room where the mercury spill occurred. START also screened the cat at the homeowners' request, with a maximum reading of 168 ng/m^3. All mercury vapor concentrations observed in the residence were well below the USEPA and ATSDR action level of 1,000 ng/m^3. As a result, the installation of polyurethane was considered a successful remediation technique, the homeowners were advised that they could resume normal occupancy with no controls in place, and the cleanup of the spill was considered complete.

6.0 SUMMARY

The Brookfield IL Residential Mercury Spill response activities were conducted at one single-family residence on June 29 and July 13, 2016. Below is a summary of removal activities:

- According to the homeowners, approximately ½ teaspoon of elemental mercury was recovered during their initial cleanup of the spill
- Mercury contamination was measured on June 29, 2016, in exceedance of the USEPA and ATSDR action level of 1,000 ng/m^3 and appeared to be limited to the wooden floor in the dining room
- Three applications of mercury absorbent powder on June 29 lowered the observed mercury vapor concentrations near the floor of the dining room. Based on the presence of young children in the house, additional remediation was recommended in the form of using polyurethane to seal any remaining mercury
- Following the installation of polyurethane by flooring contractors hired by the homeowners, mercury vapor concentrations were screend again on July 13, 2016. Concentrations in the breathing zone and at the floor were below the USEPA and ATSDR action level of 1,000 ng/m^3

7.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. Action Levels for Elemental Mercury Spills, Chemical-Specific Health Consultation for Joint EPA/ATSDR Nation Mercury Cleanup Policy Workgroup. On-Line: http://www.atsdr.cdc.gov/emergency_response/Action_Levels_for_Elemental_Mercury_Spills_2012.pdf

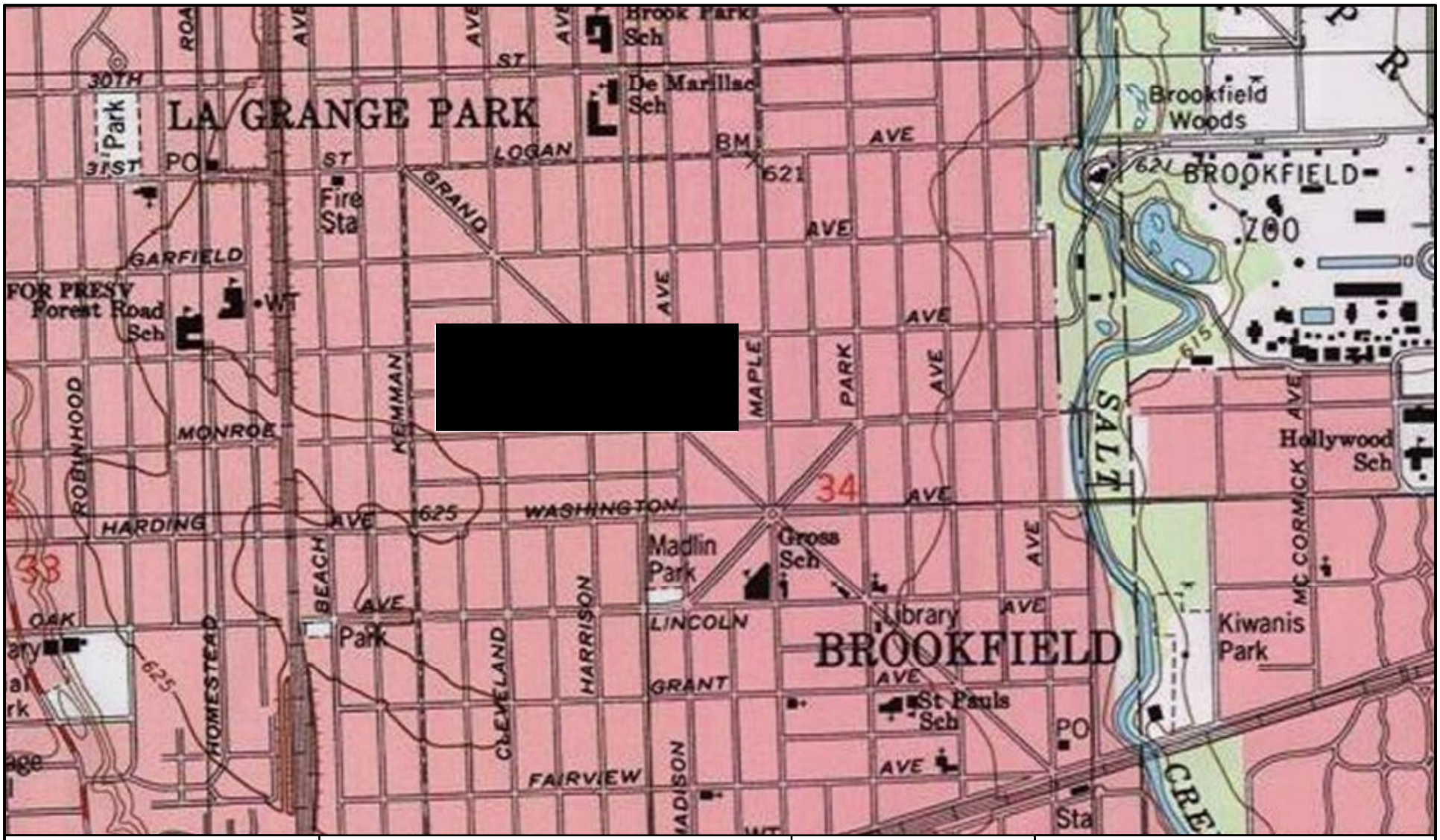
American Conference of Governmental Industrial Hygienists. "Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) – Mercury, all forms except alkyl". 2001.

Centers for Disease Control and Prevention. 2007. "Elemental Mercury Releases Attributed to Antiques". Morbidity and Mortality Weekly Report. June 15, 2007. Accessed On-Line: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5623a2.htm.

Cook County Assessor's Office. Property Characteristics. Accessed On-Line: http://www.cookcountyassessor.com/Property.aspx?mode=details&pin=15341220530000

Ohio Lumex (Lumex). 2001. Portable Zeeman Mercury Analyzer RA-915+. Accessed On-Line: http://www.ohiolumex.com/products/ra915_mercury_analyzer.htm

APPENDIX A
SITE FIGURES



Source: USGS 7.5-Minute Topographic Quadrangle Map: Berwyn, IL 2015

Brookfield IL Residential Mercury Spill
Brookfield, Illinois

Figure 1

Site Location Map

TETRA TECH

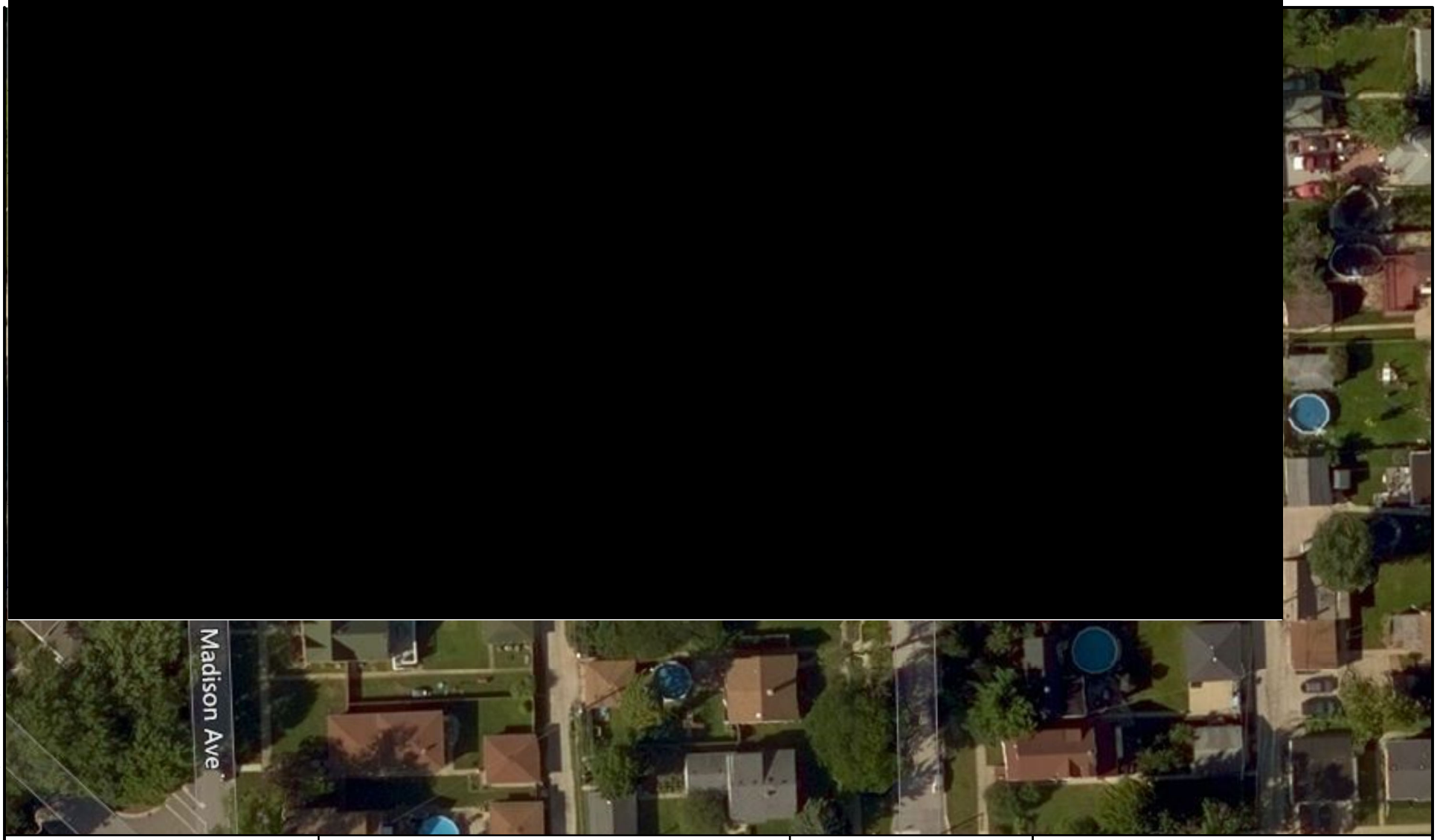
Prepared For: USEPA	Prepared By: Tetra Tech, Inc.

File Path: G:\G\G9026-START IV\Illinois\Brookfield Mercury Spill\mxd\Figure1_SiteLocation.mxd

Date Saved: 8/2/2016 EPA Contract No.: EP-S5-13-01 TDD No.: S05-0001-1606-008

Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet Projection: Transverse Mercator Datum:North American 1983 Units: Foot US

[redacted]



Legend

Approximate Property Boundary

N

40 0 40

Feet

Source: USGS 7.5-Minute Topographic Quadrangle Map: Berwyn, IL 2015

Brookfield IL Residential Mercury Spill
Brookfield, Illinois

Figure 2

Site Layout Map

TETRA TECH

Prepared For: USEPA	Prepared By: Tetra Tech, Inc.

File Path: G:\G\G9026-START IV\Illinois\Brookfield Mercury Spill\mxd\Figure2_SiteLayout.mxd

Date Saved: 8/2/2016 EPA Contract No.: EP-S5-13-01 TDD No.: S05-0001-1606-008

Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet Projection: Transverse Mercator Datum:North American 1983 Units: Foot US

APPENDIX B
TABLES

TABLE B-1: INITIAL ASSESSMENT MERCURY VAPOR CONCENTRATION RESULTS

Date	Time	Location	Breathing Zone (ng/m^3)	Floor/Surface (ng/m^3)	Temp. (°F)
6/29/2016	9:30	Female Homeowner	--	10	70
	9:30	Male Homeowner	--	8	70
	9:30	Younger Child	--	5	70
	9:30	Older Child	--	3	70
	9:35	Dining Room	74	--	72
	9:35	Dining Table	--	110	72
	9:38	Dining Room Wall (height where mirror was briefly hung)	104	--	72
	10:32	Perimeter of Dropcloth	--	296	73
	10:32	Beneath Dropcloth at spill location	--	11,700	73
	10:33	Beneath Dropcloth NE sector	--	2,000	73
	10:35	Beneath Dropcloth SE sector	--	1,255	73
	10:37	Beneath Dropcloth SW sector	--	1,011	73
	10:38	Beneath Dropcloth NW sector	--	8,851	73
	9:40	Sandals	--	73	72
	9:40	Black bag	--	95	72
	9:42	Living Room Rug	--	138	72
	9:45	Bathroom	96	103	72
	9:45	Bathroom Sink	--	101	72
	9:50	Master Bedroom	107	400	72
	9:50	Mirror in Master Bedroom	--	158	72
	9:50	Bed in Master Bedroom	--	137	72
	9:54	Gift in Closet	--	241	72
	9:54	Male Shorts in Closet	--	193	72
	9:56	Nursery	114	140	72
	10:00	Closet (Laundry basket, sheets)	--	253	72
	10:04	Kitchen	136		72
	10:05	Miscellaneous Items in Kitchen	--	144	72
	10:07	Dining Chair nearest spill location	--	146	72
	10:10	Kids' Dining Chair 1	--	157	72
	10:10	Kids' Dining Chair 2	--	149	72
	10:14	Basement	91	--	67
	10:16	Basement Mat	--	338	67
	10:18	Bags on Basement Stairs	--	152	67
	10:19	Floor Drain in Basement	--	113	67
	10:20	Bench from Dining Room, located in Basement	--	112	67
	10:22	Washing Machine	--	122	67
	10:23	Dryer	--	85	67
	10:28	Mat at Back Door	--	199	73
	10:30	Cat	--	654	73
	10:47	Bagged Clothes worn during cleanup attempt	--	4,281	75
	11:10	Garage	3	11	75
	11:12	Counter	--	14	75

Notes:

Result = Result exceeds USEPA and ATSDR residential action level for normal occupancy (> 1,000 ng/m^3)

°F = Degrees Fahrenheit

ng/m^3 = Nanograms per cubic meter

TABLE B-2: MERCURY VAPOR CONCENTRATIONS DURING REMEDIATION ATTEMPTS USING MERCURY SPILL KIT

Date	Time	Scenario	Breathing Zone (ng/m^3)	Floor (ng/m^3)	Temp (°F)
6/29/2016	10:32	Prior to Application	--	11,700	73
	12:25	After Application 1	1,200	1,800	79
	13:15	After Application 2	850	>3,000*	80
	14:05	After Application 3	330	800	80
	15:10	After Reinstallation of Plastic Dropcloth	4	2,268	79

Notes:

All results reported are maximum values

Result = Result exceeds USEPA and ATSDR residential action level for normal occupancy (> 1,000 ng/m^3)

* = Result from isolated hot spot identified on floor

°F = Degrees Fahrenheit

ng/m^3 = Nanograms per cubic meter

TABLE B-3: CLEARANCE MERCURY VAPOR CONCENTRATION SCREENING RESULTS

Date	Time	Location	Breathing Zone (ng/m^3)	Floor/Surface (ng/m^3)	Temp. (°F)
7/13/2016	10:10	Dining Room	100	161	74
	10:11	Spill Location	--	206	74
	10:13	Living Room	92	--	74
	10:15	Master Bedroom	71	--	74
	10:18	Cat	--	168	74
	10:19	Bathroom	91	--	74
	10:20	Nursery	75	--	74
	10:22	Kitchen	86	--	74

Notes:

°F = Degrees Fahrenheit

ng/m^3 = Nanograms per cubic meter

APPENDIX C

START FIELD NOTES

INCH

MADE IN TACOMA — SINCE 1916 —

Rite in the Rain

— DEFYING MOTHER NATURE —

START FIELD LOGBOOK

Logbook Tracking Number CH-144

Site Name BROOKFIELD IL RESIDENTIAL HG SPILL

Issue to ADAM PETERCA

Date Issued 6/29/2016

TDD # 0001-1606-008

MADE IN USA · RITE GREEN · Archival

RiteintheRain.com

CONTENTS

PAGE	REFERENCE	DATE

6/29/2016

0848 START (PETERCA) ON SITE AT [redacted], BROOKFIELD, IL. USEPA ON SITE (BESLOW). 68°F, SUNNY ——— AP

0909 ANTIQUE MIRROR BACK PANEL CRACKED. DISCOVERED BEADS ON SATURDAY, REMOVED MIRROR, PLACED IN GARAGE WRAPPED IN GARBAGE BAGS. VACUUMED IN HOME W/ SMALL SHARK VACUUM. BEADS OBSERVED ON TRAY AND FLOOR. CONTACTED SERV-PRO HAZMAT. THEY REMOVED MIRROR, USED AIR SCRUBBER FOR ~ 36 HOURS. ——— AP

0918 START TESTING USEPA LUMEX RA15+. R VALUES RANGE FROM 1-8%; LUMEX READY FOR USE ——— AP

0923 HOMEOWNER GRANTS ACCESS TO PROPERTY

0935 START EPA, HOMEOWNER ENTER HOUSE FOR SCREENING. ——— AP

1045 EXIT HOUSE. SCREEN BAG OF CLOTHES 1, READING 4,231

1110 SCREENING GARAGE. MAX READING 14

1150 ENTERING RESIDENCE W/ SPILL KIT TO ATTEMPT TO REMEDIATE HOT SPOTS ——— AP

1225 FINISH ~~[illegible]~~ REMEDIATION ATTEMPT. BZ READINGS MAX ~ 1,200, AVG ~ 900. HOT SPOTS ON FLOOR W/ MAX READINGS ~ 1,800. ~~[illegible]~~ AP

1245 BEGIN SECOND ATTEMPT AT REMEDIATION USING

6/29/2016

SPILL KIT ——— AP

1315 FINISH SECOND REMEDIATION ATTEPT. BZ READINGS ~600-850. TWO HOTSPOTS ON FLOOR, ONE HOT SPOT >1,600, SECOND HOT SPOT > 3,000. ——— AP

1345 BEGIN THIRD REMEDIATION ATTEMPT W/ SPILL KIT

1405 FINISH THIRD REMEDIATION ATTEMPT. BZ READING MAX 330. FLOOR MAX ~ 800.

1415 COVERING DINING ROOM FLOOR W/ VISQUEEN TO DETERMINE WHETHER SOURCES REMAIN IN FLOOR. WILL LET REST FOR ~ 1/2 HOUR, THEN SCREEN BENEATH VISQUEEN

1430 BREAK FOR LUNCH ——— AP

1510 SCREENING DINING ROOM. BZ W/ VISQUEEN MAX READING OF 4. BENEATH VISQUEEN MAX READING OF ~2,200; AVG VALUE OF APPROX. 1,200 ——— AP

1630 HOMEOWNERS WILL LIKELY OPT TO SEAL FLOORS W/ POLYURETHANE. WILL DECIDE IN NEXT FEW DAYS IF THEY/INSURANCE WILL PAY TO POLY FLOORS, OR IF EPA WILL HAVE ERRS POLY FLOORS. WILL LEAVE VISQUEEN IN PLACE UNTIL POLY IS COMPLETE. START OFF SITE.

[signature] 6/29/2016

7/13/2016

1000 START (PETERCA) ON SITE, EPA (BESLOW) ON SITE, 76° F, OVERCAST, INTERMITTENT RAIN, HIGH HUMIDITY. START WARMING UP LUMEX RA-915+ AP

1002 CALIBRATION CHECK ON LUMEX. NEXT FACTORY CAL DUE 4/7/2017. R% RANGES FROM 2-7%. LUMEX READY FOR USE.

1010 CONDUCTING SCREENING IN HOUSE. FLOORS HAVE BEEN POLYURETHANED. AP

1625 SCREENING COMPLETE. MAX BZ READING; 100 ng/m³ MAX FLOOR/SURFACE READING; 206 ng/m³

1100 START → USEPA OFF SITE

[redacted]

7/13/2016

Mercury Screening Results

Site: BROOKFIELD **Mercury Spill E.R.**

Date	Time	Location	BZ (ng/m3)	Floor (ng/m3) SURFACE/	Temp. (°F)
6/29/2016	0930	FEMALE HOMEOWNER		10	70
		MALE HOMEOWNER		8	
		YOUNGER CHILD		5	
	↓	OLDER CHILD		3	↓
	0935	DINING ROOM	74		~72
	0935	" = TABLE		110	
	0938	" = WALL (PICTURE HEIGHT)	104		
	0940	SANDALS		73	
	0940	BLACK BAG		95	
	0942	LIVING ROOM RUG		138	
	0945	BATHROOM	96	103	
	0945	" = SINK	101		
	0950	MASTER BEDROOM	107	400	
	0950	" = MIRROR		158	
	0950	" = BED		157	
	0954	CARPET		241	
	0954	MALE SHORTS		193	
	0956	NURSERY	114	140	
	1000	CLOSET (LAUNDRY BASKET, SHEETS)		253	
	1004	KITCHEN	136		
	1005	MISC. ITEMS IN KITCHEN		144	
	1007	DINING CHAIR		146	
	1010	KIDS DINING CHAIR 1		157	
	1010	" = 2		149	↓
	1014	BASEMENT	91		~67
	1016	" = MAT		338	
	1018	BAGS ON STAIRS		152	
	1019	FLOOR DRAIN		113	
	1020	BENEATH FROM DINING ROOM		112	
	1022	WASHING MACHINE		122	
	1023	DRYER		85	↓
	1028	MAT AT BACK DOOR		199	~73
	1032	DINING ROOM BENEATH VISQUEEN		11,700	
	1032	" = AROUND VISQUEEN		296	
	1030	CAT		654	
	1033	BENEATH VISQUEEN NE CORNER		2,000	
	1035	" = SE CORNER		1,255	
	1037	" = SW CORNER		1,011	
	1038	" = NW CORNER		8,851	↓
	1047	BAGGED CLOTHES		4,281	~75
	1110	GARAGE	3	11	
	1112	COUNTER IN GARAGE		14	↓
	1225	DINING ROOM POST SPILL KIT 1	Max 1,200; Avg 900	Max 1,800	~79
	1315	DINING ROOM POST SPILL KIT 2	600-850	Hot Spot 1: 1,600 Hot Spot 2: 3,000+	~80 °F
	1405	DINING ROOM POST SPILL KIT 3	Max 330	Max 800	~80°F
	1510	DINING ROOM W/ VISQUEEN	4	BENEATH VISQUEEN	~79

→ Max: 2,268
Avg: ~1,280

Notes:

BZ = Breathing Zone
°F = Degrees Faurenheit
ng/m^3 = nanograms/cubic meter
√c = Child Breathing Zone

Mercury Screening Results

Site: BROOKFIELD **Mercury Spill E.R.**

Date	Time	Location	BZ (ng/m3)	Floor (ng/m3)	Temp. (°F)
6/29/2016	1545	LIVING ROOM POST VISQUEEN	4		~79
↓	1547	MASTER BEDROOM POST VISQUEEN	11		↓
	1548	NURSERY POST VISQUEEN	8		
	1550	DINING ROOM POST VISQUEEN	~~22~~ AP 2		
↓	1552	KITCHEN POST VISQUEEN	22		↓

Notes:

BZ = Breathing Zone
°F = Degrees Faurenheit
ng/m^3 = nanograms/cubic meter
√c = Child Breathing Zone

Mercury Screening Results

Site: BROOKFIELD **Mercury Spill E.R.**

Date	Time	Location	BZ (ng/m3)	Floor (ng/m3)	Temp. (°F)
7/13/2016	1010	DINING ROOM	100	161	74
	1011	" & SW CORNER		206	
	1013	LIVING ROOM	97		
	1015	MASTER BEDROOM	71		
	1018	CAT		~~77~~ 168	
	1019	BATHROOM	91		
	1020	NURSERY	75		
	1022	KITCHEN	86		

Notes:

BZ = Breathing Zone
°F = Degrees Faurenheit
ng/m^3 = nanograms/cubic meter
√c = Child Breathing Zone

APPENDIX D

SUPPLEMENTAL DOCUMENTATION

[REVISED OCTOBER 1999]

CONSENT FOR ACCESS TO PROPERTY

(NAME OF SITE)

(City, State)

Name: [redacted]

Address of Property: [redacted] Brookfield, IL 60513

I consent to officers, employees, contractors, and authorized representatives of the United States Environmental Protection Agency (U.S. EPA) entering and having continued access to this property for the following purposes:

Containing hazardous materials present on the property;

Conducting monitoring and sampling activity;

Preparing for and disposing of hazardous materials;

Performing other actions to investigate contamination on the property that U.S. EPA may determine to be necessary; and

Taking any response action to address any release or threatened release of a hazardous substance, pollutant or contaminant which U.S. EPA determines may pose an imminent and substantial endangerment to the public health or the environment.

I realize that these actions taken by U.S. EPA are undertaken pursuant to its response and enforcement responsibilities under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. '9601 et seq.

This written permission is given by me voluntarily, on behalf of myself and all other co-owners of this property, with knowledge of my right to refuse and without threats or promises of any kind.

6/29/16 [redacted]

Date Signature

APPENDIX E
ENVIRONMENTAL IMPACTS

Environmentally Preferred General Field Practices Checklist
TDD No.: 0001-1606-008
Site Name: Brookfield IL Residential Mercury Spill
Date: 8/3/2016

Environmentally Preferred **General Field** Practices			
If a general category is not applicable, then check N/A for the category box, not for each subcategory.	N= Not Used	N/A= Not Applicable	**Comments Section** Justify in the comments when applicable BMPs are not used. Cost Analysis, when performed and applicable, is a reasonable justification.
Energy	Y		
Use of Energy Efficient Equipment	Y		
Computer Equipment (FEMP/Energy Star)	Y		
Reduce Carbon Emissions from Transportation	Y		
Use Internet Based Meetings/Conferences		N/A	
Maximize Carpooling		N/A	
Use of Local Labor/Suppliers (50 mile radius)	Y		
No idling, except for extreme weather conditions	Y		
Use of Alternative Fuels, if available within 10 miles	N		Response vehicle requires E85
Properly Inflated Tires	Y		
Email Small Files (less than 8MB)	Y		
Reusable Electronic Storage Media or the	Y		
Water		N/A	
Use of Low Flow Sampling Pumps			
Waste		N/A	
Use of Local Recycling Programs			
Use of Rechargeable Batteries			
Direct Push Boring			
Materials	Y		
Printing when Required	Y		
Double-sided Printing	Y		
100% post-consumer recycled paper	Y		
Land & Ecosystems		N/A	
Minimize Disruption to Natural Vegetation			
Use of Non-invasive Investigation Techniques			
Environmentally Preferred		N/A	
Green Procurement			
Environmentally Preferred Vendors			
Green Lodging/Hotels			
Use of Green Laboratories			

Final Site and Annual Report on Environmental Activities and Impact

Greenhouse Gas Reduction Goal- 1% Annual reduction in GHG emissions

Source	Amount Used	Methane (CH_4)	Nitrous Oxide (N_2O)	Carbon Dioxide ($CO_{2)}$
Gasoline	5 gallons			0.044 metric tons

Resources: **www.epa.gov/cleanenergy/energy-resources/calculator.html**
http://205.254.135.7/oiaf/1605/coefficients.html

A brief description of the practices implemented to promote sustainability as applicable to this site is provided below.

The following practices were implemented to **maximize sustainability**:

- Documents were not printed, but were prepared, stored, and distributed electronically, thus saving on ink and paper.
- When printing was deemed necessary, recycled printing paper and two-sided printing was utilized.
- Biodegradable cleaning products were used in the office.

The following practices were implemented to **reduce energy and water use**:

- A programmable thermostat was used in the office building to minimize use of natural gas and/or electricity
- Phone conferences and email correspondence were used for communications regarding the site to minimize use of fuel

The following practice was implemented to **promote carbon neutrality**:

- Idling of vehicles on site was prohibited during site work.